
Highlights

Executive Summary

Overview of Diabetes in Utah

- Over 63,000 Utahns have been diagnosed with diabetes.
- Another 34,000 Utahns have diabetes, but have not yet been diagnosed.
- One-third of all cases of diabetes in Utah are aged 65 years and over.
- Diabetes is more prevalent in minority populations than in non-Hispanic whites.
- Prevalence of diabetes in Utah is increasing and this trend is expected to continue due to the aging of the population and increasing proportion of minority ethnic groups. Increasing obesity and sedentary lifestyles also contribute to the increasing prevalence of diabetes.

Socioeconomic Characteristics of Utah Adults with Diabetes

- There is little gender variation in the prevalence of diabetes in Utah, although females are slightly more likely to be diagnosed than are males.
- Utahns with diabetes are more likely to be in lower income and education brackets than Utahns without diabetes.
- 91.8 percent of Utahns with diabetes have some type of medical insurance.

Comorbidity, Lifestyles and Quality of Life Among Utahns with Diabetes

- Nearly one in three Utahns with diabetes are obese, compared to about one in eight Utahns without diabetes, after adjusting for age.
- Utahns with diabetes are more likely to have a chronic condition in addition to diabetes than Utahns without diabetes, especially cardiovascular disease and asthma.
- One in four Utahns with diabetes over the age of 45 have some form of heart disease, compared to about one in twelve Utahns without diabetes.
- Utahns with diabetes are about four times more likely to report their health as fair or poor than Utahns without diabetes.
- A higher percentage of Utahns with diabetes report they experience activity limitations caused by poor health than Utahns without diabetes.
- Utahns with diabetes report poorer emotional health than Utahns without diabetes.
- Utahns with diabetes are nearly five times more likely to report feeling pain severe enough to interfere with everyday activities than Utahns without diabetes.

Overview of Diabetes in Utah

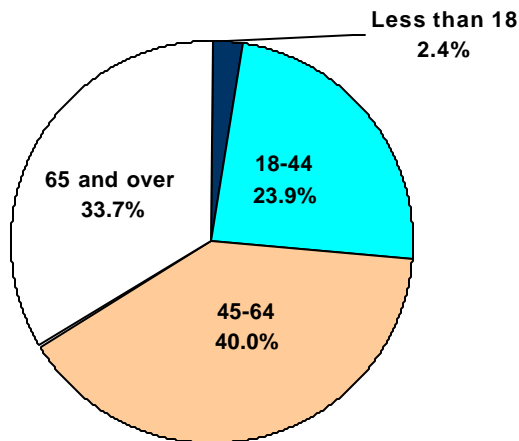
Diabetes Mellitus is not a single disease but a variety of metabolic disorders that result from excessively high blood glucose levels. Diabetes is a chronic, lifetime condition with no cure and potentially devastating complications. It is the leading cause of blindness in adults age 20 to 74. Risks of heart disease and stroke are two to four times higher in individuals with diabetes than in those without. Diabetes is the leading cause of end-stage renal disease, with approximately 40 percent of all new cases of end-stage renal disease directly attributable to diabetes. It is the leading cause of non-traumatic lower extremity amputations. Nerve damage brought on by diabetes can create severe pain and impaired sensation in hands and feet.

Diabetes is generally classified into two broad categories: (1) type 1, an autoimmune disease, which occurs when the pancreas produces too little or no insulin, and (2) type 2, which results from an inability of the body to use insulin, too little insulin production or a combination of both. A third type of diabetes, gestational diabetes, develops in women during pregnancy and usually disappears after delivery. However, women who develop gestational diabetes are at increased risk for developing type 2 diabetes later in life. There is increasing evidence that infants born to mothers with diabetes may be at increased risk of developing diabetes themselves.¹

The Population at Risk

The American Diabetes Association estimates that one in eight Americans will develop diabetes in his or her lifetime.² As of 2000, more than 63,000 Utahns, almost three percent of the population, have been diagnosed with diabetes. Approximately 34,000 more Utahns have diabetes, but have not been diagnosed.³ Individuals may unknowingly have diabetes for as long as ten years and be diagnosed only after serious complications have developed.

Figure 1-1. Age Distribution of Utah Population with Diabetes
Utah Health Status Survey, 1996

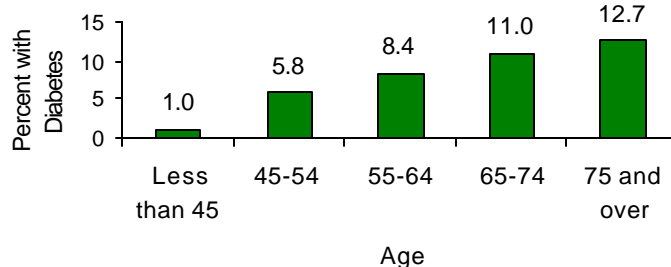


The proportion of the population at risk for developing diabetes has increased dramatically in recent years, both nationally and in Utah. A large part of this increase is attributed to the aging of the population and the increasing numbers of residents who are members of ethnic or racial minority groups.

In Utah, 40 percent of the population with diabetes is between the ages of 45 and 64, and another 33.7 percent is 65 or older (See Figure 1-1). Only about one in four Utahns with diabetes is under age 45.

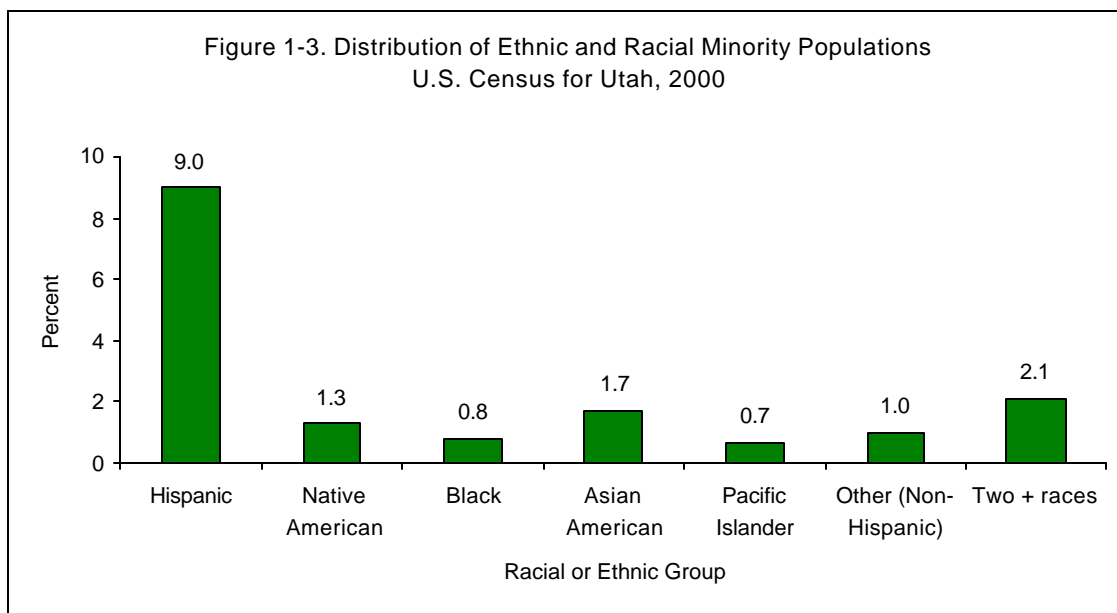
Prevalence of Diabetes by Age Group

Figure 1-2. Prevalence of Diagnosed Diabetes
Among Utahns by Age Group:
Utah Health Status Survey, 1996



Another way to look at a prevalence of diabetes is to examine the percent of people by age who have diabetes. Less than one percent of Utahns under age 45 have diabetes (Figure 1-2). The percentage with diabetes increases steadily across the age groups. The highest prevalence is in the age group 75 years and over,

12.7 percent.



The chart in Figure 1-3 shows the percent of the population in Utah made up of members of minority ethnic or racial groups. Non-Hispanic whites comprise 85.3 percent of the Utah population (not shown in the graph). Hispanics may be of any race. The percentage for “Hispanic” in this chart includes those who identified themselves as Hispanic white or as some classification of Hispanic in the “other” race category. Note that some members of the other races may also include individuals who identified themselves as Hispanic. Therefore, Hispanic ethnicity is slightly over-represented in this chart.

The Bureau of Census made changes in the race categories for the 2000 Census. The traditional classification “Asian/Pacific Islander” became separate categories in the 2000 Census. The 2000 Census also allowed individuals to identify themselves by two or more races. For more information on the ethnic and racial breakdown of the Utah population, see Supplement to Section 1 at the end of this section.

The prevalence of diabetes is higher for Hispanics, Blacks, and Native Americans than for non-Hispanic Whites. There is also growing evidence that prevalence is now higher for Asian Americans and Pacific Islanders, as well. The growth of population within these minority ethnic and racial groups in Utah was especially rapid in the past decade. Since 1990, the percentage of the population in minority ethnic/racial groups increased from nine percent to 15 percent.⁴ Hispanics are the largest minority ethnic group in the state, comprising 9.0 percent of the 2000 Utah population. This percentage is nearly double the 1990 percentage of 4.7 percent⁵

There has been a pronounced increase in diabetes prevalence across every age category. In addition to the changing demographic composition, obesity and sedentary lifestyles have also contributed to the increase in diabetes. Lifestyle modifications, including balanced diets and regular exercise, could prevent the onset of diabetes for many.

.The Burden of Diabetes in Utah

Diabetes Mellitus is a major cause of morbidity and mortality in Utah, putting a considerable burden on health care delivery systems. Costs are projected to increase dramatically in the near future.⁶ In 1999, there were 16,911 hospitalizations for Utah residents listing diabetes as a primary or related diagnosis. The average charge per hospitalization was \$11,750, with the total amounting to almost \$188 million dollars. There are additional untold indirect costs in terms of lost productivity, disability, and premature mortality.⁷

National estimates from 1997 indicated that the annual medical costs for individuals under age 65 with diabetes are over three times the costs for their counterparts without diabetes. For those 65 and over with diabetes, the cost is almost double that for people without diabetes.⁸

References and Notes

1. Diabetes Complications (2001). *Diabetes 2001 Vital Statistics*, American Diabetes Association, Inc: 334-374.
2. Risk Factors For Diabetes (2001). *Diabetes 2001 Vital Statistics*, American Diabetes Association, Inc: 29-42
3. These numbers were derived by applying NHANES III rates of diagnosed and undiagnosed diabetes to the 1996 Utah Health Status Survey age-adjusted prevalence rates and applying them to the 1999 Utah population
4. Population Estimates Program (1990, 2000) Population Division, U.S. Census Bureau, Washington, D. C.
5. U.S. Census Bureau (2000). Table DP-1. Profile of General Demographic Characteristics: Utah
<http://www.census.gov/population/estimates/state/srh/srh90.txt>
6. According to the director of the Centers for Disease Control and Prevention (CDC), Jeffrey Koplan, MD, MPH, the effect on the nation's health care costs will be overwhelming if the trend continues.
7. Economic Consequences of Diabetes Mellitus in the U.S. in 1997 (1998). *Diabetes Care*.
8. Average cost of \$10,071 compared to an average of \$2,699 for a person without diabetes.

Estimated Ethnic and Racial Numbers and Percentages of the Utah Population, 2000

Table S1-1. Estimated Ethnic Characteristics of Utah Population, 2000		
Race/Ethnicity	Number	Percent
Non-Hispanic White	1,904,265	85.3
Hispanic	201,559	9.0
Non-Hispanic Other Race	117,345	5.7
Total Population	2,223,169	100.0

Table S1-2. Estimated Racial Characteristics of Utah Population, 2000		
Race/Ethnicity	Number	Percent
White	1,992,975	89.2
Black	17,657	0.8
Native American	29,684	1.3
Asian	37,108	1.7
Pacific Islander	15,145	0.7
Other Race	93,405	4.2
Two or More Races	47,195	2.1
Total Population	2,223,169	100.0

Source: U.S. Census, Census 2000, Table DP-1. Profile of General Demographic Characteristics: Utah

Socioeconomic Characteristics of Utah Adults with Diabetes

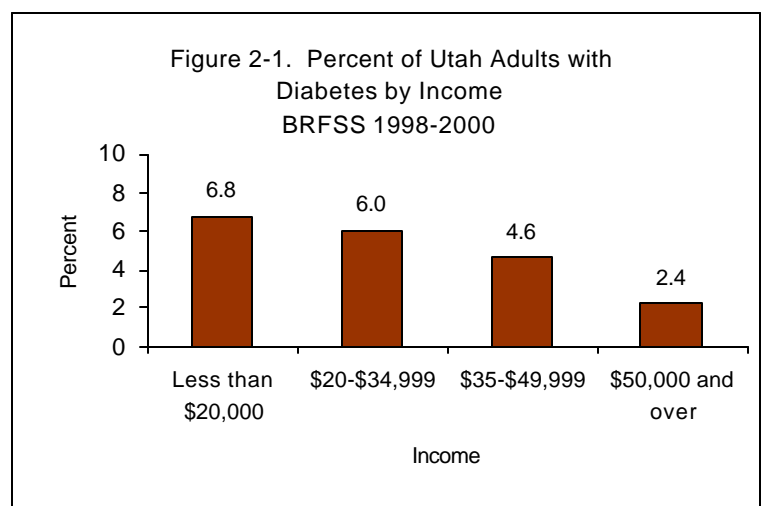
The relationship between low socioeconomic status and poor health is well established, but the direction of the relationship is not always clear. The relationship may exist because individuals in poor health drift down to lower levels of income and occupation. Conversely, occupying lower socioeconomic status may hinder the ability to adopt lifestyles optimal for good health.¹

Regardless of the direction, socioeconomic status is associated with many aspects of health, including health insurance coverage, use of preventive health services, perceptions of health, and participation in health-promoting behaviors.

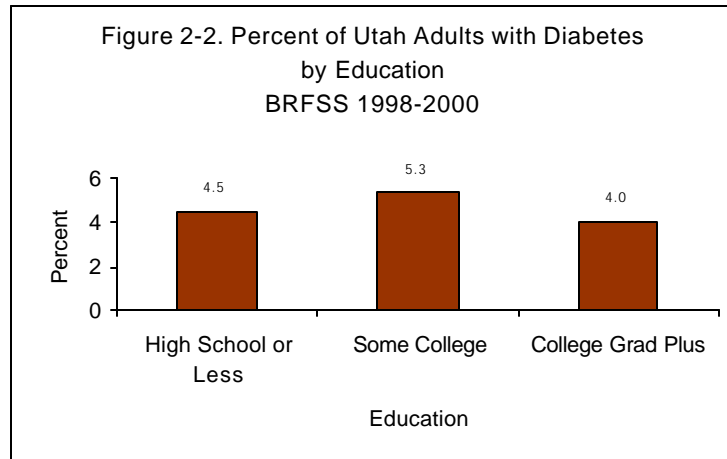
The following section uses data from the Utah Behavioral Risk Factor Surveillance System (BRFSS). The BRFSS is an annual, nationally directed survey of adults 18 or over. Numbers of respondents who report having diabetes in the Utah BRFSS samples are consistently small, about 125 per year. To increase reliability of the information, data from 1998 through 2000 were combined.²

Income and Education

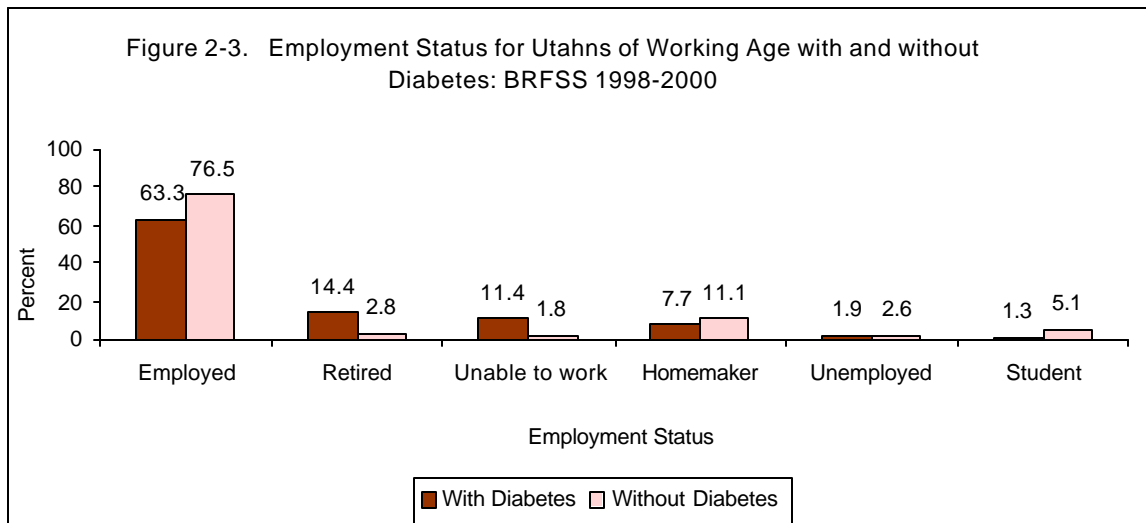
Prevalence of diabetes decreases with rising income in Utah (Figure 2-1). The prevalence for Utah adults living in households with less than \$20,000 annual income is almost triple that of those residing in households with \$50,000 or more annual income (6.8 percent vs. 2.4 percent). Among Utah adults with annual household incomes between \$20,000 and \$34,999, 6.0 percent have diabetes. In households between \$35,000 and \$49,000, 4.6 percent have diabetes. These percentages should be interpreted with some caution. Lower incomes among the elderly, who have higher rates of diabetes, may contribute to higher rates in lower income groups.



Prevalence rates by education are more varied, with the highest prevalence of diabetes found among Utah adults with some college education (See Figure 2-2). Over five percent of the members of this group had diabetes, compared with 4.5 percent of Utahns with a high school degree or less, and 4.0 percent of Utahns with a college degree or higher.

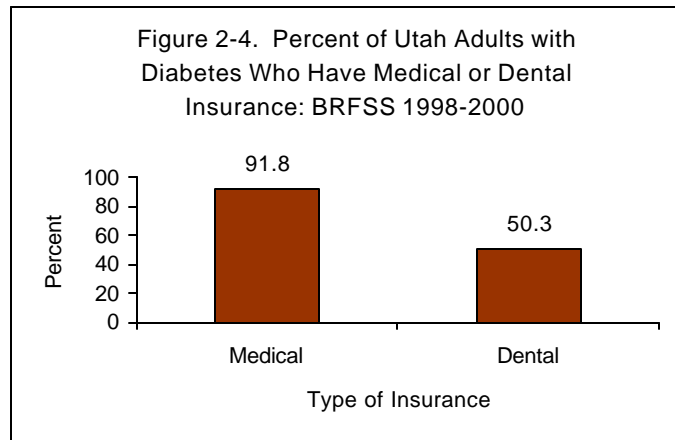


In the BRFSS, contrasts in employment status for Utahns of working age (18 to 64) with and without diabetes are shown in Figure 2-3. Utahns with diabetes were slightly less likely to be employed (including self-employed) and more likely to be retired than those without diabetes. The most striking contrast is seen among those stating they were unable to work. Over ten percent of Utahns with diabetes reported they were unable to work, almost six times the percentage for those without diabetes.



Insurance Status

Most Utah adults with diabetes have at least one form of medical insurance. BRFSS results indicate that 91.8 percent of Utahns with diabetes report having some type of medical coverage (Figure 2-4). Only 50.3 percent, however, report having dental insurance. Lack of dental coverage is a serious concern for people with diabetes because they are more prone to periodontal disease and tooth loss than people without diabetes. Infections resulting from tooth decay and periodontal disease can lead to difficulties in diabetes control and the possibility of serious acute complications.



About 40 percent of Utahns with diabetes are covered by Medicare. The vast majority of Utahns with diabetes age 65 and over have Medicare coverage, as might be expected. However, almost ten percent of Utahns with diabetes ages 18 to 64 are also covered by Medicare. This percentage compares with two percent of Utahns age 18 to 64 without diabetes.

References and Notes

1. Young, RK (1998). Modeling Determinants of Population Health. *Population Health: Concepts and Methods*. Oxford: New York: 95-139
2. Utah Behavioral Risk Factor Surveillance System (1998-2000). Office of Public Health Assessment. Salt Lake City, UT: Utah Department of Health.

Comorbidity, Lifestyles, and Quality of Life Among Utahns with Diabetes

People are living longer and are increasingly likely to survive with chronic conditions. While many might enjoy longer life expectancies, they are likely to spend the increased years in poor health. Longer survival leads to a greater risk for developing multiple chronic conditions and associated poor quality of life. As a result, quality of life issues are becoming an integrated component of comprehensive medical care.

Comorbidity

Approximately every five years, the Utah Department of Health conducts the *Utah Health Status Survey*, a statewide survey to assess health among Utah residents of all ages. Information from this survey allows assessment of various aspects of health for the population, including comorbidity, lifestyle, and quality of life. This section uses information from the 1996 round of the survey.¹

Diabetes was associated with higher risk for each comorbid condition assessed in the survey. The extent of comorbidity is shown in Table 3-1.² Column 2 shows the percent of people with diabetes who experience an additional chronic condition. Column 3 shows the percent of people without diabetes who experience the same chronic condition. Column 4 shows the age-adjusted percent of Utahns without diabetes with the condition as though the age distribution for the populations with diabetes and without diabetes were similar.³ Finally, Column 5 shows the age-adjusted ratio of Utahns with diabetes with each chronic condition compared to those without diabetes. Comorbid conditions may complicate the treatment of diabetes and complicate effective management. Diabetes is more common among people of older ages, and it is sometimes difficult to know whether some of the problems associated with diabetes may be more attributable to age than to diabetes. Age-adjusting is a method used to eliminate age as a confounding factor.

Table 3-1. Percent of Utahns With and Without Diabetes Reporting Comorbid Conditions Utah Health Status Survey, 1996				
(1)	(2)	(3)	(4)	(5)
Condition	With Diabetes	Without Diabetes Unadjusted	Without Diabetes, Age-Adjusted	Age-Adjusted Ratio
Hypertension	31.5	5.8	15.1	2.1
Stroke	5.2	0.8	2.6	2.0
High cholesterol	24.2	5.5	15.1	1.6
Cardiovascular disease	29.1	2.2	8.1	3.6
Arthritis	19.9	4.6	13.5	1.5
Asthma	10.5	3.9	4.3	2.4
Obstructive pulmonary disease	5.3	0.9	2.3	2.3

Utahns with diabetes are more than twice as likely to have high blood pressure and to have had a stroke as those without diabetes, after adjusting for the effect of age. They are about one and one-half times as likely to have high cholesterol levels. Most striking, but not unexpected, they are over three and one-half times more likely to have cardiovascular disease than Utahns without diabetes.

Utahns with diabetes are also more likely to have chronic conditions not directly related to diabetes. They are one and one-half times as likely to have arthritis, and over twice as likely to have asthma or chronic obstructive pulmonary disease (COPD) as people without diabetes.

Lifestyle Risk Factors

Certain lifestyle factors increase the risk of developing type 2 diabetes. Being overweight

and/or being physically inactive are particularly strong risk factors for diabetes. As may be seen in Table 3-2, there is little difference in participation in physical activity between Utahns with and without diabetes.⁴ Similarly, there is little difference between those with and without diabetes who are moderately overweight. The major difference between the two groups is the prevalence of obesity. People with diabetes are two and one-half times as likely to be obese as people without diabetes, even after controlling for age differences.

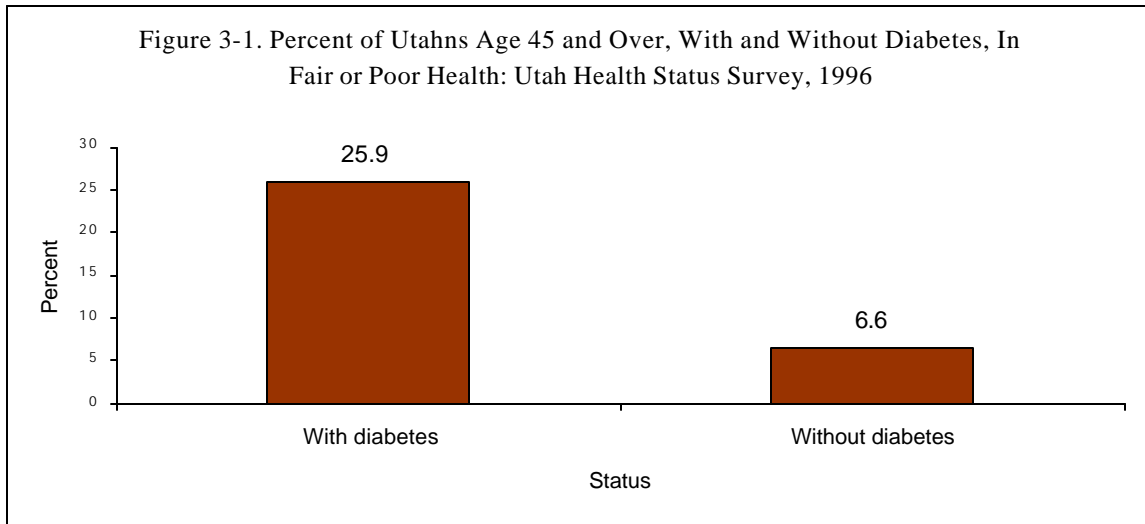
Table 3-2. Percent of Utahns With and Without Diabetes Participating in Selected Lifestyle Behaviors Utah Health Status Survey, 1996				
(1)	(2)	(3)	(4)	(5)
Lifestyle Characteristic	With Diabetes	Without Diabetes Unadjusted	Without Diabetes, Age-Adjusted	Age-Adjusted Ratio
Physically inactive	38.6	39.1	44.8	1.0
Moderately overweight	31.2	21.1	32.4	1.0
Obese	30.5	8.5	12.3	2.5

Quality of Life Indicators

The Utah Health Status Survey uses the SF-12 Scale to assess physical and emotional well-being in the Utah population. The SF-12 is a frequently used, national, quality of life scale with two basic components: physical well-being and mental well-being.⁵ These two components are derived through a series of 12 questions which measure subjective health, activity limitations, the effect of pain on activities, and emotional difficulties. The following six charts (Figures 3-1 through 3-6) show the percentages of Utahns with and without diabetes for four categories of the SF-12 Scale.⁶ In order to reduce the effect of age, the information is limited to Utahns age 45 and over. The survey questions are shown in Appendix A.

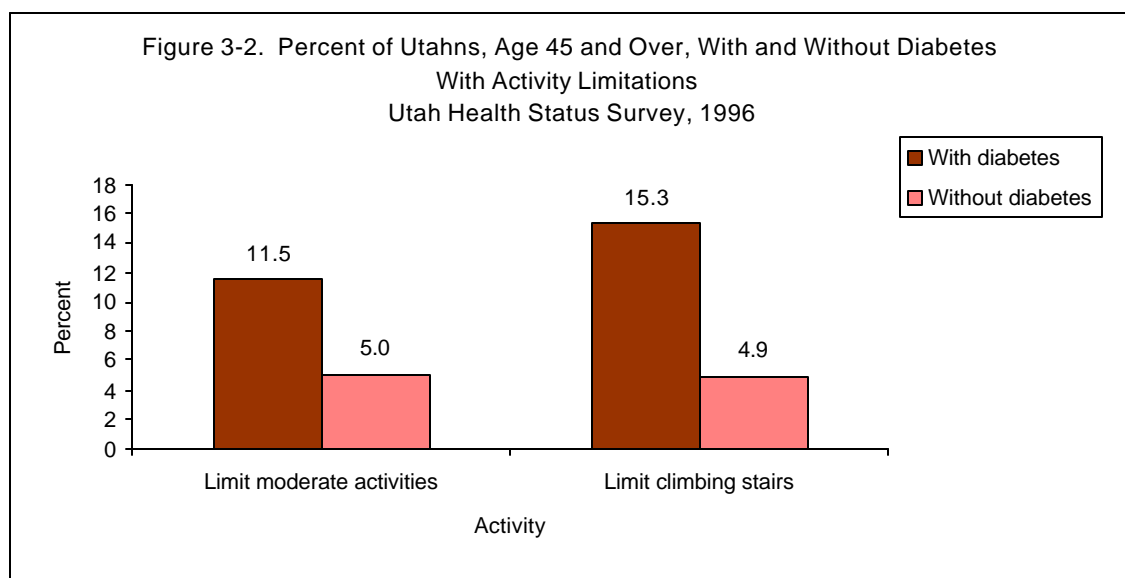
Self-Reported Health Status

Subjective health status reflects actual health. Numerous studies have found subjective health to be highly correlated with chronic conditions and the suffering brought on by those conditions.⁷ Utahns age 45 and over with diabetes are almost four times as likely to report being in fair or poor health as those without diabetes (Figure 3-1).



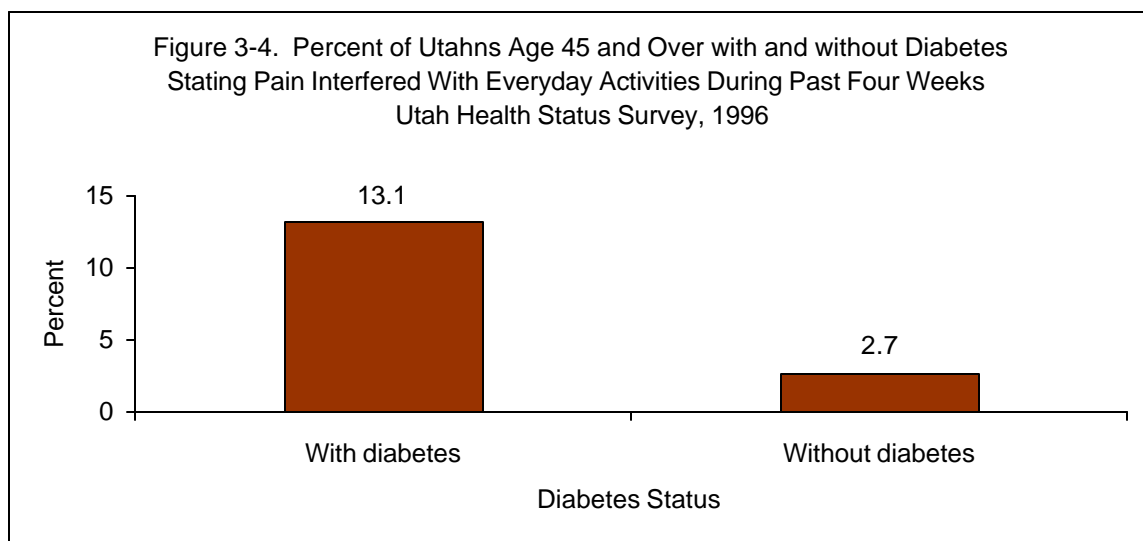
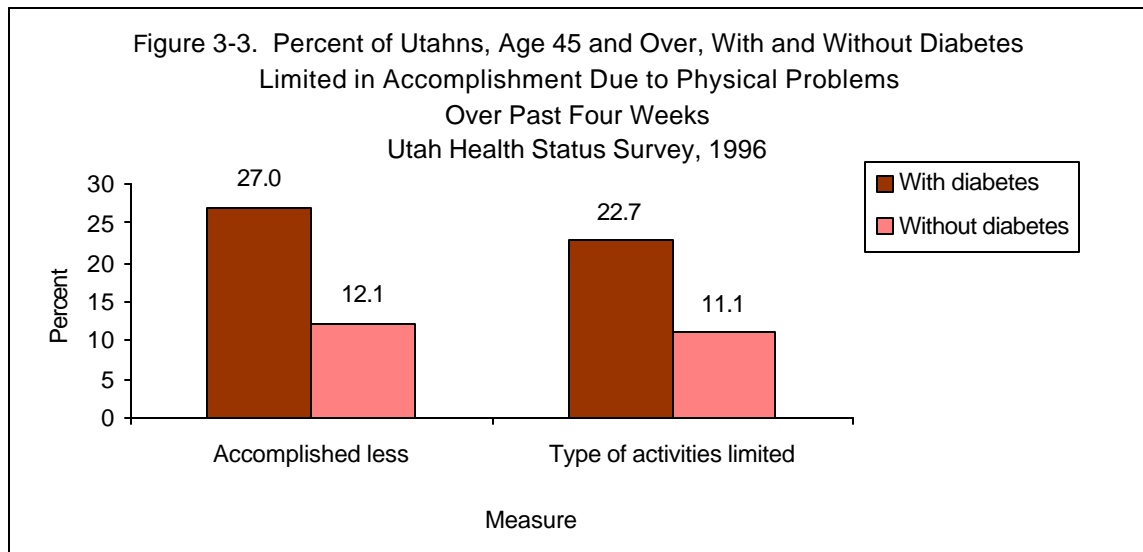
Activity Limitations

Questions on activity limitations comprise a major component of the SF-12 Scale. In this survey, Utahns age 45 and over with diabetes were more likely than those without diabetes to

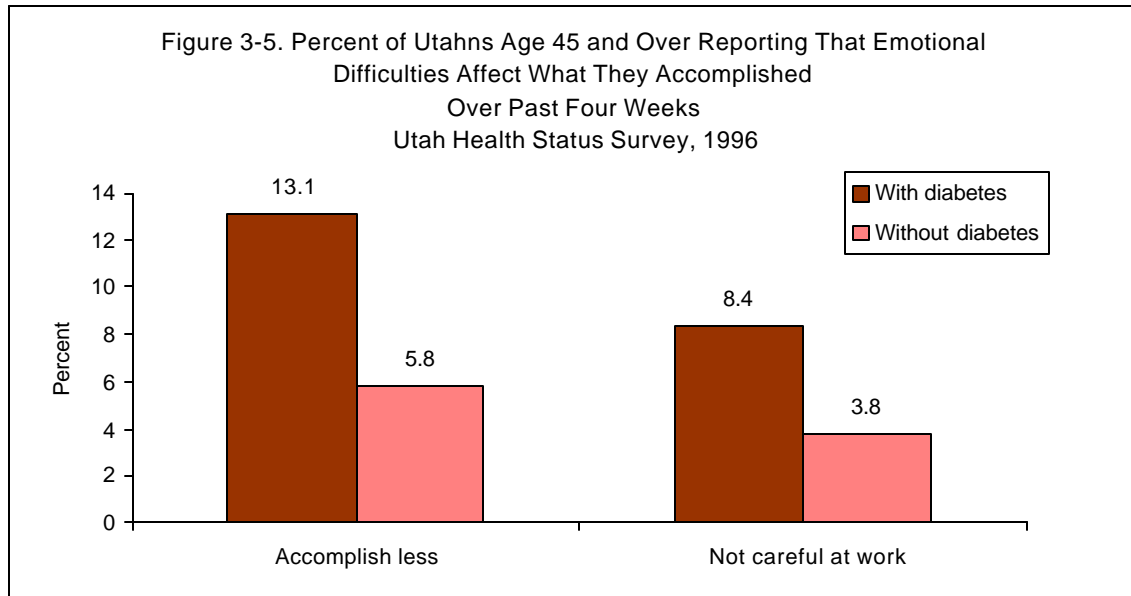


report physical activity limitations, across all measures of activity limitations in the SF-12 (Figure 3-2). They were more than twice as likely to report that their health limited their ability to conduct moderate activities, such as moving a table or playing golf. They were more than three times as likely to report that their health limited their ability to climb several flights of stairs.

Similarly, they were over twice as likely to report that their physical health limited the amount they accomplished over the past four weeks (Figure 3-3). Finally, Utahns with diabetes were twice as likely to report that their physical health limited the types of activities they could do during the past four weeks.



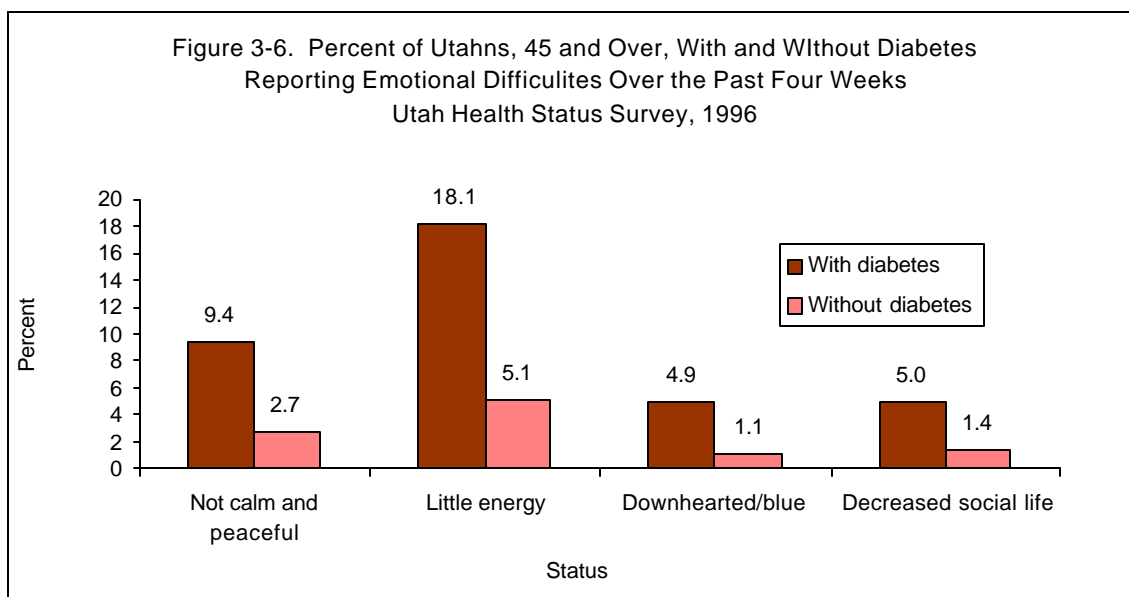
Problems related to diabetes often cause pain. Peripheral neuropathy (damage to the nerve coatings) and angina are common in people with diabetes. As seen in Figure 3-4, Utahns age 45 and over with diabetes are nearly five times more likely to report that pain interferes with daily activities than those without diabetes.



Mental Health

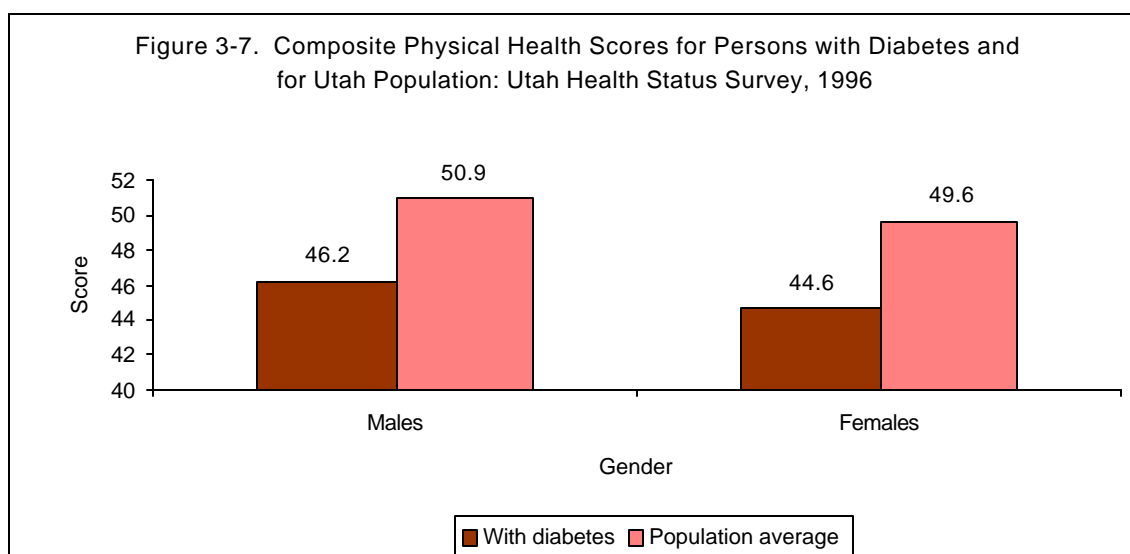
In the survey, Utahns with diabetes were more affected by emotional problems than those without diabetes. Close to two and one-half times as many people with diabetes reported that emotional problems, such as feelings of depression or anxiety, affected their accomplishments during the prior four weeks as people without diabetes (Figure 3-5). They were also over twice as likely to report that emotional problems caused them to be less careful than usual at work or in other activities over the past four weeks.

Overall, Utahns with diabetes in this survey were more likely to report being depressed and feeling stressed than those without diabetes. Utahns, age 45 and over, with diabetes, were over three times as likely to report they rarely felt calm and peaceful over the past four weeks (Figure 3-6). They were almost four times as likely to report they rarely had a lot of energy over the past four weeks. Utahns with diabetes reported over four times as often spending the last four weeks feeling downhearted and blue as those without diabetes. They were almost three and one-half times as likely to report that their physical health or their emotional problems interfered with social activities, such as visiting friends or family, much of the time over the past four weeks.



Composite Physical and Mental SF-12 Scores

Composite scores summarize measures of all questions used in the SF-12 Scale into a physical component and a mental component. Figures 3-7 and 3-8 summarize the information in the above section by aggregating scores for the physical and mental components of the SF-12 Scale by gender. The average scores for people with diabetes were compared to the average scores for the total population.⁸ In this report, the population used is the total sample of the respondents in the Utah Health Status Survey, ages 18 and over.

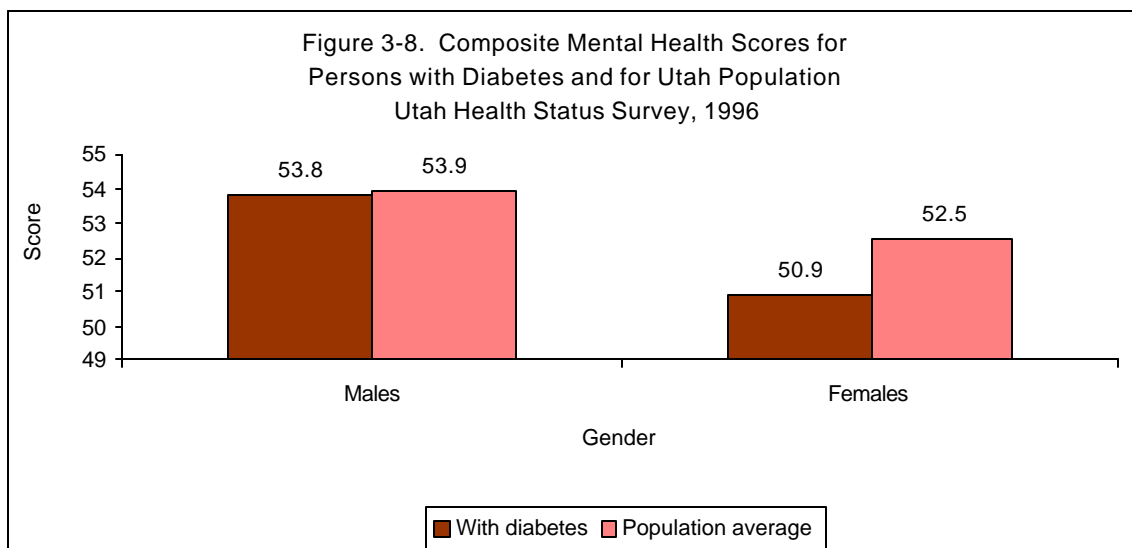


In Figure 3-7, the composite physical health scores for people with diabetes for both genders

are below the respective means. Males fare slightly better than females. Males have scores 4.7 points below the male population mean, where females score 5.0 points below the female population mean.

There was more gender variation for the composite mental scores (Figure 3-8). Males with diabetes had virtually the same score as the male population. Scores for females with diabetes, on the other hand, were 1.6 points below the female population mean.

In summary, as assessed by the SF-12 Scale, males with diabetes have higher physical and mental health scores than their female counterparts. Females with diabetes have lower physical and mental health scores than the female population as a whole. Males with diabetes score lower on physical well-being than the male population as a whole, but the degree of difference is less than that for females with diabetes. Males with diabetes appear to have the same level of mental well-being as males without diabetes.



References and Notes

1. Office of Public Health Assessment (1996) *Utah Health Status Survey*. Salt Lake City, UT: Utah Department of Health.
2. This table is adapted from the Massachusetts 1994-1996 Diabetes Summary Report, *Table 1. Prevalence and Risk Factors for Cardiovascular Disease, by Diabetes Status, Massachusetts BRFSS, 1994-1996*.
3. Age-adjusting controls for the effect of age. In this instance, the table shows the percent of people without diabetes who would experience a chronic condition if the age distribution of people without diabetes were the same as for people with diabetes.
4. Physically inactive means not participating in a healthy level of activity, defined as exercising at least three times per week for at least 30 minutes a session.
5. Ware, JE, Jr. (2001). Advances in Methods for Monitoring Health Status Outcomes. Paper presented at Park City, UT.
6. Office of Public Health Assessment (formerly Bureau of Surveillance and Analysis) (1997). *Health Status in Utah: The Medical Outcomes Study SF-12* (1996 Utah Health Status Survey Report). Salt Lake City, UT: Utah Department of Health.
7. See, for examples, the following:
Verbrugge, LM (1984). A health profile of older women with comparisons to older men. *Research on Aging* 6:291-322.

Rakowsik, W and Fleishman, JV Mor. and S Bryant (1993). Self-assessments of health and mortality among older persons. *Research on Aging* 15:92-116.

Idler, EL, Kaskl SV, and Lemke, JH (1990) Self-reported evaluated health and mortality among the elderly in New Haven, Connecticut, and Iowa and Washington counties, Iowa 1982-1986. *American Journal of Epidemiology* 82: 9-103.
8. For more detailed information, see The Health Status of Populations in Utah (1997) of *Health Status in Utah: The Medical Outcomes Study SF-12* (1996 Utah Health Status Survey Report). Salt Lake City, UT: Utah Department of Health: 61 - 65.

Diabetes Management and Complications

Approximately every five years, the Utah Diabetes Control Program conducts a survey of Utahns with diabetes.¹ The most recent survey was conducted in 1997, with a sample size of 239 respondents, ranging in age from eight to eighty-eight (The most knowledgeable adult answered for respondents under the age of 18). The average age of the respondents was 53.9 years, and the average age at diagnosis was 44.6 years. Over half, 56.1 percent, were male. Most respondents were non-Hispanic whites (93.7 percent). The information presented in this section is taken from the 1997 Utahns with Diabetes Survey.

Nationally, five to 10 percent of people with diagnosed diabetes have type 1. In this sample of Utahns, however, 16.7 percent reported having type 1 diabetes. Whether or not the sample was skewed, or this information was misreported, cannot be ascertained. Three in four (74.9 percent) reported having type 2 diabetes. Another 8.4 percent of the sample did not know or did not answer this question.

Forty-five percent of the respondents reported using insulin. Insulin users were much less likely to report using oral medications (18.5 percent vs. 65.4 percent) and slightly less likely to participate in an exercise program (55.6 percent vs. 60.9 percent) (See Table 4-1). On the other hand, insulin users were somewhat more likely than non-users to follow a meal plan (66.7 percent vs. 60.0 percent).

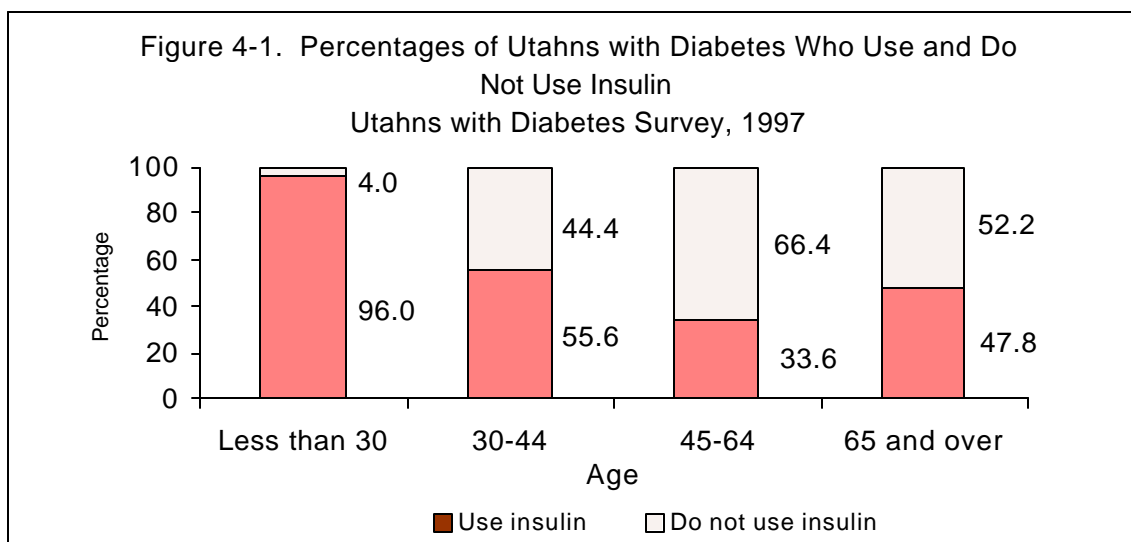


Table 4-1.	Contrasts in Methods Used to Control Diabetes Reported by Insulin Users and Non-Users	
Management Strategy	Insulin Users	Non-Users
Average Age in Years	49.4	57.8
Percent Using Oral Medications	18.5	65.4
Percent Using Meal Plan	66.7	60.0
Percent Using Exercise Plan	55.6	60.9

The percentage of Utahns with diabetes who were using insulin declined with age. Almost all respondents who were under age 30 reported using insulin (96 percent), reflecting the greater prevalence of type 1 diabetes in this age group. Over half of those 30 to 44 reported using insulin, and one-third of those who were age 45 to 64 reported using insulin. This decline was followed by an upswing in insulin use among those who were 65 and over (Figure 4-1).

Hospitalizations Among Utahns with Diabetes

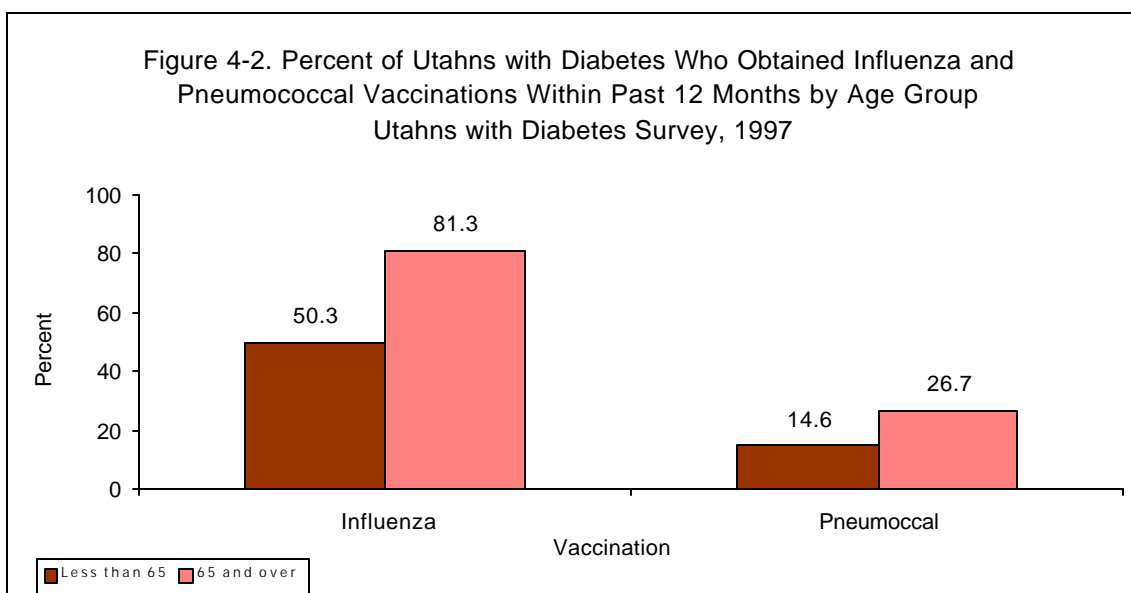
Four of five Utahns with diabetes in 1997 had not been hospitalized in the prior year (Table 4-2). Nonetheless, age variations were evident. Those age 65 and over were substantially more likely to be hospitalized than those under age 65. They were more than twice as likely to have experienced multiple admissions (8.0 percent vs. 5.6 percent). While some respondents in this sample were hospitalized for reasons other than diabetes (e.g., motor vehicle accidents, burns, deliveries, unrelated surgeries), the majority of visits were directly related to diabetes and its complications. Respondents reported being hospitalized for influenza, heart problems, leg and foot ulcers, dialysis-related complications, and kidney transplants.

Table 4-2. Hospitalizations During Prior Year for Utahns with Diabetes by Age Group Utahns with Diabetes, 1997			
Number of times Hospitalized	Less than Age 65 (n=164)	Age 65 and Over (n=75)	Full Sample (n=239)
Not hospitalized	83.5	73.3	80.3
One time	12.2	18.7	14.2
Two or more times	3.6	8.0	5.0
Missing	0.7	—	0.5

Immunization Among Utahns with Diabetes

People with diabetes are much more likely to die of or be hospitalized for influenza or pneumonia than those without diabetes. The Utah Diabetes Control Program has taken an aggressive approach to promote awareness of the need for the recommended immunizations. People with diabetes should have an influenza vaccination annually and a pneumococcal vaccination at least once by age 65. If a pneumococcal vaccination was obtained prior to age 60, a second one is recommended after age 65.

In 1997, those Utahns with diabetes who were 65 years of age and older were much more likely than their counterparts under 65 to have obtained both an influenza vaccination (81.3 percent vs. 50.3 percent) and a pneumococcal vaccination (26.7 percent vs. 14.6 percent) in the prior 12 months. Information on the percentage of those who had received a pneumococcal immunization more than 12 months prior to the survey was not available.



Duration of Diabetes and Complications

Table 4-3. Manifested Complications Based on Duration of Diabetes Utahns with Diabetes Survey, 1997			
Diabetes-Related Condition	Percent for Less Than 10 Years Duration (n=148)	Percent for 10 Years or More Duration (n=89)	Increase in Percent for Duration of 10 Years or More
<i><u>Vision Problems</u></i>			
Glaucoma	4.7	5.6	19.1
Cataracts	25.0	38.2	52.8
Diabetic retinopathy	4.7	25.8	448.9*
<i><u>Cardiovascular Problems</u></i>			
High blood pressure	54.7	56.2	2.7
Heart disease	18.2	30.3	66.5
Heart attack	13.5	16.9	25.2
Stroke	4.1	5.6	36.6
<i><u>Other Complications</u></i>			
Protein/albumin in urine	9.5	16.9	77.9
Kidney failure/dialysis	2.0	3.5	75.0
Lower extremity amputation	0.7	4.5	542.9*
Cuts/sores over 10 days	8.8	16.9	92.0
Neuropathy	39.2	57.3	46.2

* These complications had small numbers. Small increases maximize the percentage increase markedly.

The likelihood of having diabetes-related complications tends to be greater with longer duration; however, variations in the degree of difference are evident (Table 4-3). In this sample, duration differences for two complications were particularly pronounced: diabetic retinopathy and lower-extremity amputation. Diabetic retinopathy prevalence increased dramatically for those with duration of diabetes for ten years or more. The relative increase in the percent with

lower extremity amputation was similar; however, the number of Utahns reporting this complication was small.

Perhaps of greater interest are the percentages of diabetes-related conditions that are similar for short and long durations. The percentage of Utahns with high blood pressure who had diabetes for less than ten years was similar to the percentage among those who had diabetes ten years or longer. Percentages with glaucoma, and, to a lesser extent, heart attack and stroke also appear to be fairly independent of duration.²

The percentages must be interpreted with some caution. The increase in the percent with complications may be due to the effect of age as well as duration of diabetes.

Self-Monitoring Techniques Used by Utahns with Diabetes

Regular monitoring of blood sugar plays an essential role in the proper management of diabetes and in reducing complications. Checking feet regularly for ulcers, blisters, pressure spots, and loss of sensation can help prevent unnecessary lower extremity amputations.

Table 4-4 Percent of Utahns by Frequency of Monitoring Blood Glucose Utahns with Diabetes Survey, 1997	
Frequency of Monitoring Blood Glucose Levels	Percentage Distribution
Check blood glucose 1-8 times daily	52.3
Check blood glucose 1-4 times weekly	20.3
Check blood glucose 1-5 times monthly	9.3
Check blood glucose 1-6 times annually	4.6
Never monitor blood glucose	13.5

Over half of Utahns with diabetes checked their blood glucose levels at least once a day (Table 4-6). Of those, one-fourth checked their levels four or more times a day (not shown). One in five checked their blood glucose levels one to four times a week. Just under one in ten checked blood glucose levels one to five times a month, and less than five percent checked glucose levels once every two months or less. A shocking one in eight reported that they never checked their own blood glucose levels.

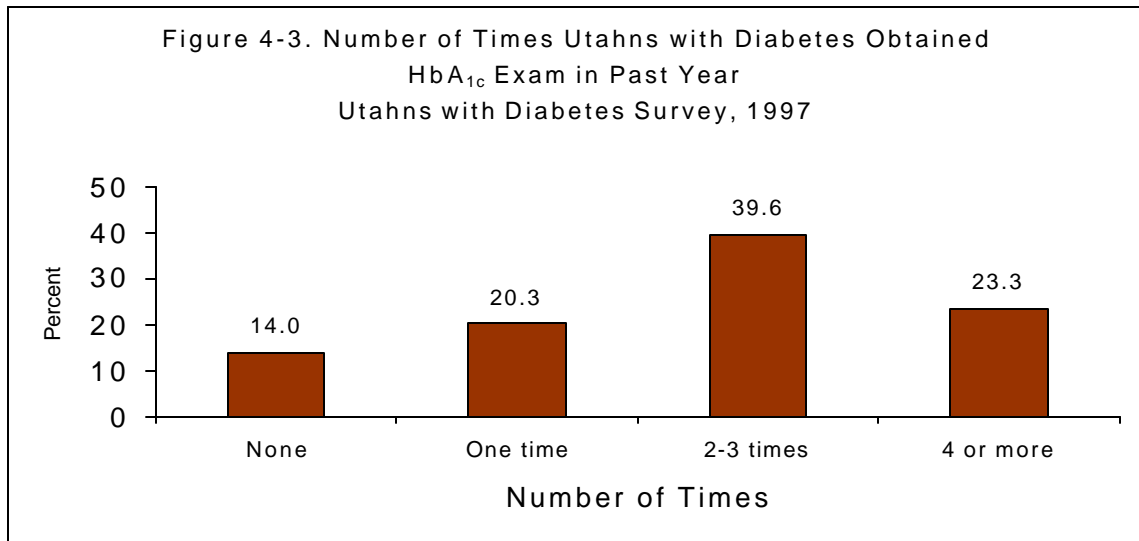
Table 4-5. Frequency of Self-Administered Foot Exams Utahns with Diabetes Survey, 1997	
Frequency of Foot Inspections	Percentage Distribution
Check feet daily	63.2
Check feet 1-4 times weekly	10.9
Check feet 1-4 times monthly	1.7
Never check feet	14.6
Don't know	8.8

People with diabetes should be especially diligent about checking their feet for sores if they are older than 40, have had diabetes over ten years, or have a history of neuropathy, peripheral vascular disease, or foot problems. Almost two-thirds of Utahns with diabetes reported that they checked their feet for sores or irritations daily (Table 4-7). About one in nine checked their feet between one and four times per week. Less than two percent reported they checked their feet between one and four times a month. About 15 percent reported that they never checked their feet for sores.

Percent of Utahns with Diabetes Obtaining Specialty and Ancillary Services

Table 4-6. Specialty and Ancillary Services Sought by Utahns With Diabetes in Past Year Utahns with Diabetes Survey, 1997	
Specialty Service or Ancillary Service	
Optometrist/ophthalmologist	65.3
Dentist	59.8
Dietician/nutritionist	29.7
Diabetes educator	21.8
Podiatrist	21.5
Diabetes specialist	17.2
Psychotherapist	7.5

Almost two-thirds of Utahns with diabetes had seen an optometrist or ophthalmologist during the past 12 months (Table 4-6). Three in five had seen a dentist. Approximately one in five had seen a podiatrist, and about one in five had seen a diabetes educator. Less than one in five had seen a diabetes specialist. Less than one-third had seen a dietitian or nutritionist. Although depression tends to be common among people with diabetes, only about one in 13 had visited a psychotherapist.



Hemoglobin A_{1c} (HbA_{1c}) exams reflect the average blood glucose levels for as long as the prior three months. Almost one-third, 30.3 percent, reported they had not heard of HbA_{1c} testing. The percentages in Figure 4-3 include only those respondents who reported they had heard of this exam. It is likely that this percentage has declined substantially since the survey was conducted in 1997. Close to 40 percent of respondents had two or three exams, and 23.3 percent had four or more exams.

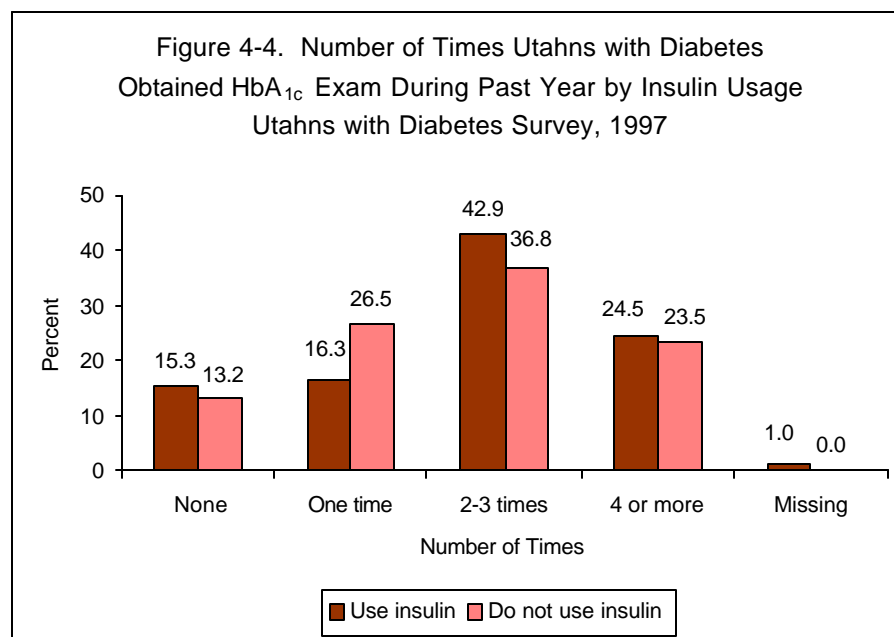
There was a great deal of similarity in frequency of obtaining HbA_{1c} exams between respondents who used insulin and did not use insulin. The greatest contrast is seen for those who had only one HbA_{1c} exam in the past year. Over one-fourth of the respondents who did not use insulin had only one HbA_{1c} exam the prior year.

Sources of Diabetes Information

**Table 4-7. Sources of Diabetes Information for Utahns with Diabetes:
Utahns with Diabetes Survey, 1997**

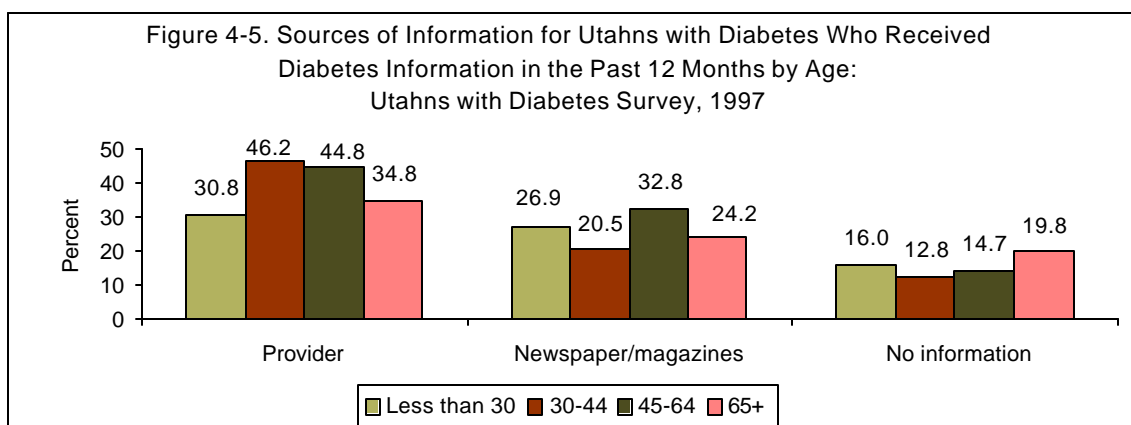
Source	Percent Stating Each Source
Primary care provider	38.9
Newspaper/magazines	29.3
Relative or friend	8.4
American Diabetes Association	5.0
Dietitian or nutritionist	4.2
Pharmacist	2.9
Diabetes class at clinic or hospital	2.9
Library	1.3
Health department	0.4
Other	11.7
Obtained no diabetes information	19.7

* Respondents could choose more than one category



Access to information is an important component of comprehensive diabetes management. In this survey, respondents were asked to report where they received diabetes information during the prior 12 months. The most commonly cited source of diabetes information was the primary care provider (Table 4-7). Nearly two of five Utahns with diabetes cited their primary care providers as a source of information for diabetes. The second most cited sources were newspaper and magazine articles about diabetes (e.g., *Diabetes Forecast*) (29.5 percent). About one in five Utahns with diabetes reported they had not obtained any diabetes information within the past 12 months.

In order to determine whether certain age groups were more likely to receive information from certain sources or perhaps were more at risk for not receiving information, a limited analysis of



sources of information was conducted. Most notably, less than one in three Utahns under age 30 reported receiving information from their provider during the past 12 months (Figure 4-4). One in five Utahns with diabetes age 30 to 44 reported they obtained diabetes information from newspapers or magazines, compared to almost one in three of those age 45 to 64. Almost 20 percent of Utahns 65 and over reported that they had not received any diabetes information during the past 12 months.

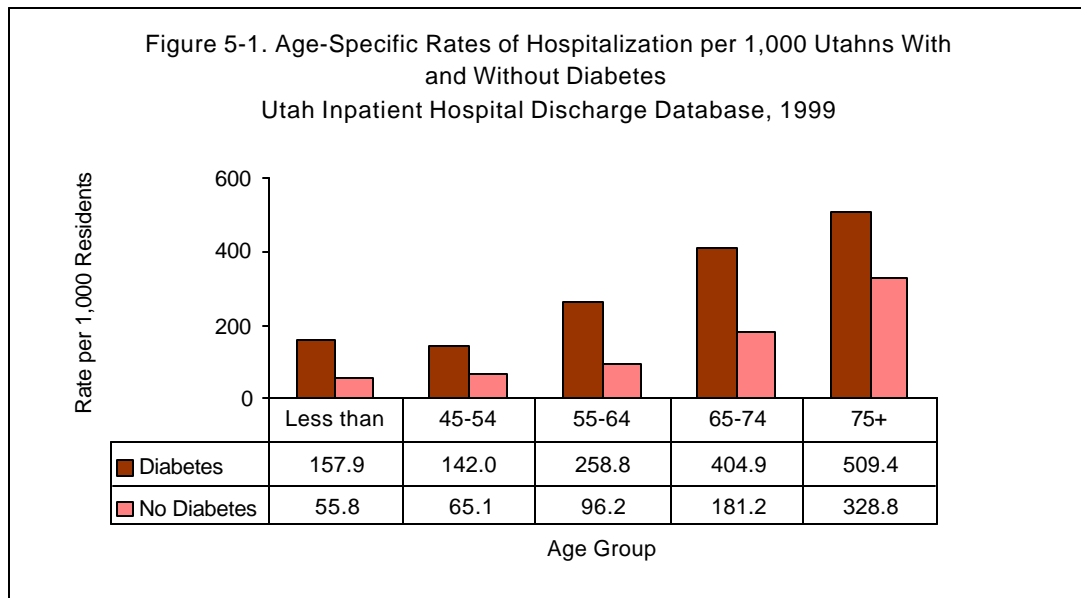
References and Notes

1. Utahns with Diabetes Survey (1997). Utah Diabetes Control Program. Utah Department of Health.

Hospitalizations for Utahns with Diabetes

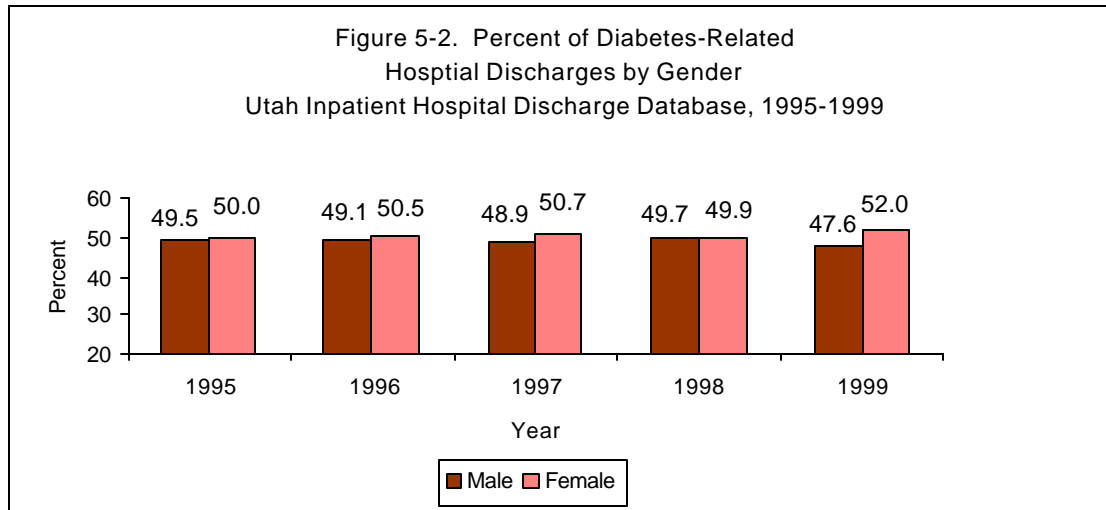
Diabetes is a major reason for hospitalization.¹ Diabetes was listed as a primary or secondary diagnosis in 7.7 percent of all Utah inpatient hospitalizations in 1999.² For simplicity, in this section, discharges listing diabetes as the first diagnosis will be referred to as “primary discharges.” Discharges listing diabetes as a contributing diagnosis (diagnoses two to nine) will be referred to as “diabetes-related discharges.”

Discharge Rates by Age for Utahns With and Without Diabetes



Diabetes increases the likelihood of hospitalization. In Utah, the greater rate of hospitalization for diabetes-related discharges (with diabetes as any listed diagnosis) is consistent across all age groups compared to discharges not listing diabetes (Figure 5-1). In every age category up to age 75, rates of discharges listing diabetes are more than twice as high as those not listing

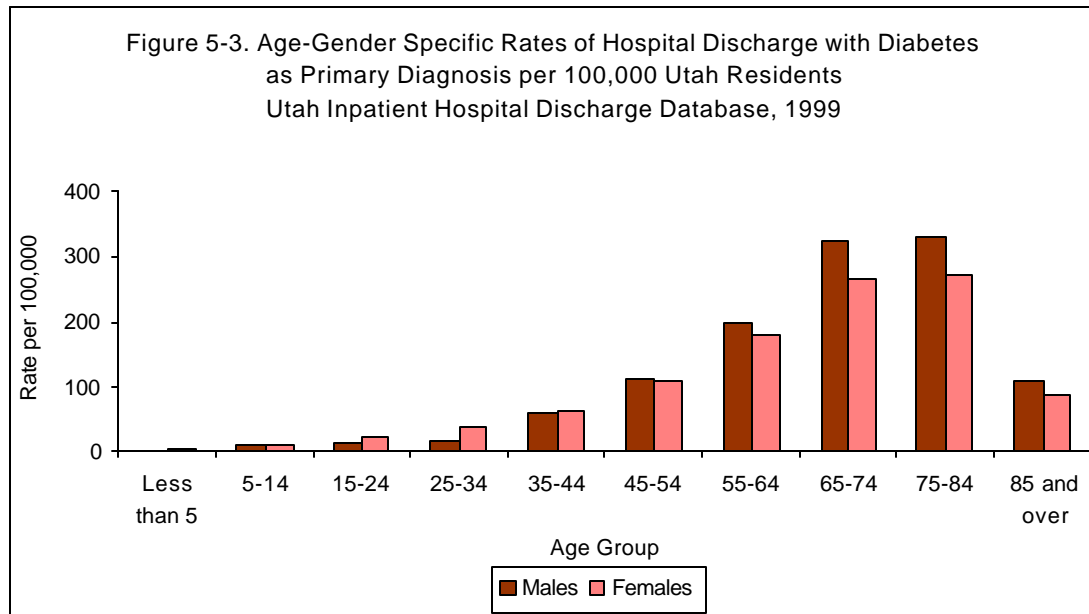
diabetes, with the greatest difference seen in the category less than 45 years of age. Among those 75 and over, the rates for diabetes-related discharges are still one and one-half times those not listing diabetes. *Note: The rates in Figure 5-1 are based on two different populations: (1) the population with diabetes by age group and (2) the populations without diabetes by age group.*



Discharge Rates by Gender

There is little gender difference in diabetes-related hospitalizations, and the similarity is consistent across years.³ The percent of all hospitalizations by gender for 1995 to 1999 is shown in Figure 5-2. Overall, the percent of discharges tended to be slightly higher for females, with the greatest difference in 1999.

An interesting pattern emerges, however, when age-specific rates for discharges listing diabetes as any diagnosis are examined for 1999 (Figure 5-3). Females had higher rates of hospitalization for all age groups up to age 45. At age 45, the trend reversed, and rates of hospitalizations were higher for males (See Appendix B for numbers and rates).



Discharge Rates for Diabetes as Primary and Any-Listed Diagnosis

There was considerable variation in the age-adjusted discharge rates by the cause of hospitalization. In Table 5-1, the numbers and age-adjusted rates for the major diabetes-related complications are shown. The first two rows show the contrast in rates between diabetes listed as a primary or any listed cause of hospitalization. In 1999, there were 1,960 discharges, or 108.2 discharges per 100,000 Utah residents, listing diabetes as the primary diagnosis. However, diabetes was listed as a primary or contributing diagnosis for 16,911 discharges, or 1,100.4 discharges per 100,000 Utahns. *Note: The rates in Table 5-1 are based on 100,000 Utah residents.*

Table 5-1. Summary of Hospital Discharge Status for Utah Residents with Diabetes Based on Primary Diagnosis and Any-Listed Diagnosis Utah Inpatient Hospital Discharge, 1999		
	Primary	Any Listed
Number of Discharges for Diabetes	1,960	16,911
Discharge Rates for Diabetes-Related Discharges per 100,000 Utah Residents	108.2	1,100.4
Average Charge per Discharge	\$9,368	\$11,751
Sum of Charges	\$17,926,815	\$187,914,587
Average Length of Stay (days)	4.3	5.0
Total Days	8,508	83,910
Average Age	45.4	63.6

Approximately 12 percent of all diabetes hospitalizations had diabetes as the primary diagnosis. Length of stay for hospitalizations with diabetes as any diagnosis were longer (5.0 compared to 4.3 days). The average age at admission was higher for hospitalizations with diabetes as any diagnosis, 63.6 compared to 45.4. The total charges for hospitalizations for diabetes listed as any diagnosis was close to \$188 million. This compares to approximately \$18 million when only primary diagnosis as diabetes was considered.

Discharge Rates for Diabetes-Related Complications

Table 5-2. Numbers and Rates of Diabetes-Related Discharges per 100,000 Utah Residents, Age-Adjusted to U.S. 2000 Population Utah Inpatient Hospital Discharge Database, 1999		
Complication	Number of Discharges	Rate per 100,000
Acute Metabolic Complications	692	32.3
Major Cardiovascular Disease	4,307	293.5
Lower-Extremity Amputation	275	18.2
Renal Disease, Kidney Transplant or Hemodialysis	1,771	113.0
Ophthalmic Manifestations	1,025	63.6

There was considerable variation in the age-adjusted rate discharge rates for diabetes-related complications (Table 5-2). Acute metabolic complications include ketoacidosis, hyperosmolar coma, or other type of diabetes-related coma. Ketoacidosis is more frequent among younger individuals with type 1 diabetes, while hyperosmolar coma tends to be more common among the elderly. In 1999, there were 692 discharges listing acute metabolic complications as a primary diagnosis, or 32.3 discharges per 100,000 Utahns.

Cardiovascular complications are the most common complications among individuals with diabetes. Cardiovascular complications have the highest rates for all diabetes-related complications, 293.5 per 100,000 Utah residents. Rates for renal disease, kidney transplants or hemodialysis were second highest, 113.0 per 100,000 Utah residents. The lowest number of discharges was for nontraumatic lower-extremity amputations, 18.2 discharges per 100,000 Utah residents.

Summary of Hospitalizations, 1995-1999

There has been a gradual increase in the number of hospitalizations with diabetes listed as any diagnosis over the past eight years. Table 5-3 shows the number of discharges, the average length of stay in days, and the average charge per discharge, for years 1995 through 1999.

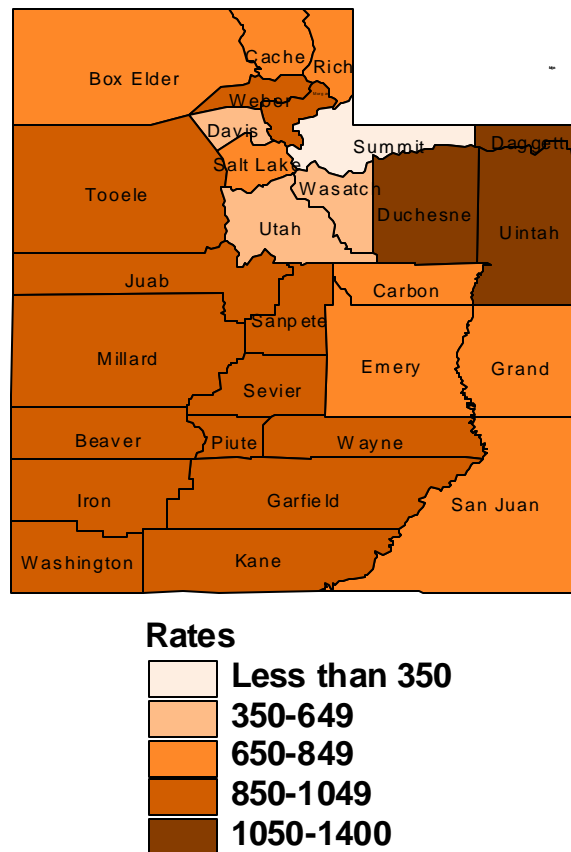
Table 5-3. Summary of Inpatient Hospital Discharges Listing Diabetes as Primary Diagnosis Among Utah Residents Utah Inpatient Hospital Discharge Database, 1995- 1999				
Year	Number of Discharges	Average Age	Average Length of Stay (days)	Average Charge
1995	1,613	44.0	5.2	\$8,137.24
1996	1,688	43.8	4.1	\$7,301.42
1997	1,772	44.9	4.5	\$8,361.72
1998	1,838	45.2	4.9	\$8,681.73
1999	1,960	45.4	4.3	\$9,365.39

The number of hospital discharges listing diabetes as a primary diagnosis has increased steadily. Table 5-3 illustrates this increase in Utah for a five-year period. The average age at hospitalization has increased consistently, from 43.8 in 1996 to 45.4 in 1999, an increase of 1.6 years. The average length of stay showed no consistent trend, ranging from 4.1 days in 1996 to 5.2 days in 1995. The higher average length of stay in 1995 is reflected in the higher average charge seen in 1995. An interesting point is that the average charge was over \$1,200 higher in 1999 than in 1995, although the average stay was nearly a day shorter.

Discharge Rates by Health District

There was considerable variation in the rate of hospitalizations by health district. Figure 5-4 plots the rates of discharges per 100,000 residents for each of the 12 Utah health districts for 1999. Tri-County Health District had the highest rate, 127.1 discharges for every 100,000 residents in the district. Tri-County has a high Native American population, many of whom live on reservations.

Figure 5-4. Crude Rates of Diabetes-Related Discharges per 100,000 Residents by Health District: Utah Hospital Discharge Database, 1999

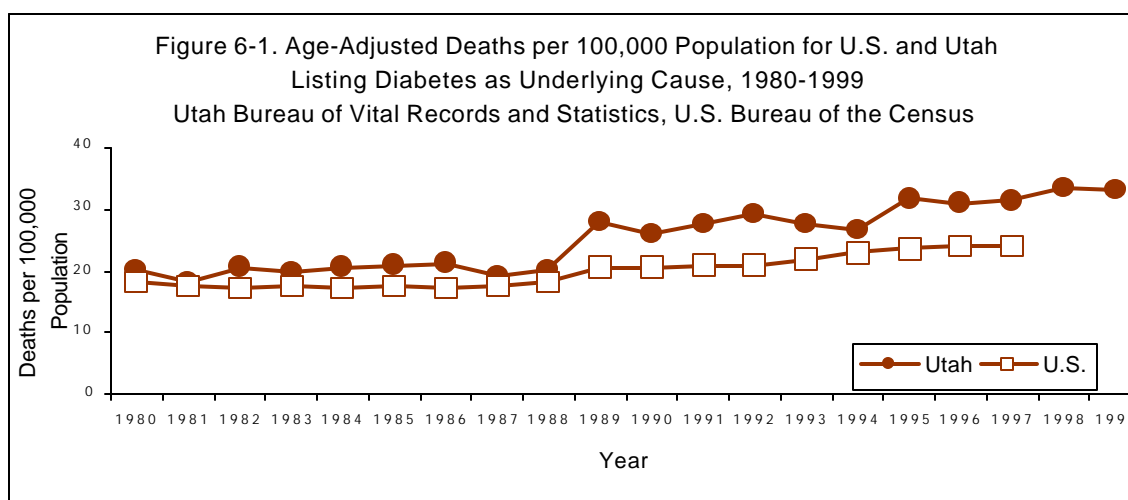


References and Notes

1. Utah Inpatient Hospital Discharge Database, Office of Health Care Statistics, Utah Department of Health, 1992-1999
2. Infants discharged at seven days of age or younger were excluded from the analyses.
3. Women use more health care services than men, and their health care costs more (2000) *Agency for Healthcare Research and Quality*: May: 9

Diabetes-Related Mortality

Death certificates are recorded by the Bureau of Vital Records and Statistics, Utah Department of Health. The information for Utah presented in this section is taken from the death record file. Death certificates usually list more than one cause of death. In Utah, death certificates may record up to ten causes. Causes of death are generally classified as either the underlying cause or the contributing cause of death. Underlying cause of death refers to the illness or condition that ultimately led to the death. Contributing causes of death generally refer to deaths listed anywhere on the death certificate. A contributing cause is sometimes known as any listed or



related cause.

Diabetes as Underlying Cause of Death: U.S. and Utah

Utah death rates for diabetes have consistently exceeded the U.S. death rates, although the degree of difference has varied over time.¹ The rates for the underlying cause of death, age-adjusted to the 2000 U.S. population, are shown in Figure 6-1. Of special note, the differences tended to be greater during the 1990s than during the 1980s. In 1999, there were 32.9 deaths

with diabetes as the underlying cause of death per 100,000 Utahns. This represents a 65% increase in the age-adjusted death rate since 1980. The higher death rate for diabetes in Utah is unexpected in light of the lower prevalence of diabetes in the state. It has been speculated that Utah physicians may more readily list diabetes as the underlying cause rather than as a contributing cause on the death certificate than is generally the case nationally.

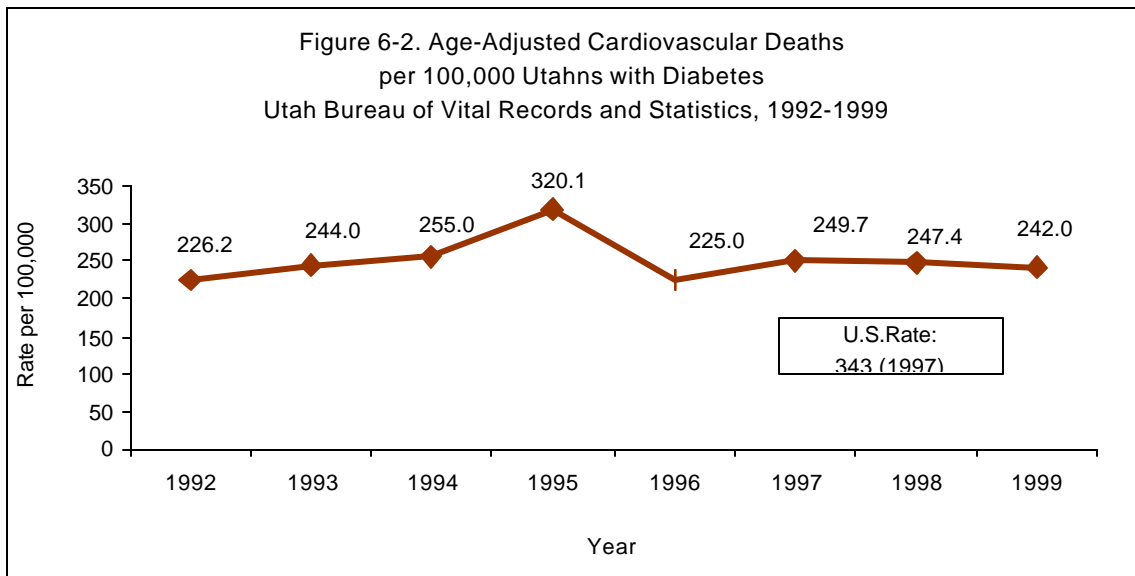
Number of Deaths with Diabetes as Any Listed Cause

Table 6-1. Number of Diabetes-Related Deaths by Age Bureau of Vital Records and Statistics , 1995-1999					
Age Group	Number of Deaths				
	1995	1996	1997	1998	1999
0-4	0	1	0	0	0
5-14	1	0	2	1	0
15-24	0	1	2	1	0
25-34	9	7	2	6	9
35-44	30	33	30	30	30
45-54	46	39	49	41	50
55-64	104	88	76	110	107
65-74	247	230	241	247	265
75-84	335	308	337	354	366
85 and over	208	213	227	249	222
Total death	980	920	966	1,039	*1,052

*Column does not add to total due to missing age data on three death certificates.

The number of deaths with diabetes as any listed cause increases with age until age 85. Following an initial decline between 1995 and 1996, the total count of deaths rose steadily between 1996 and 1999. Between 1997 and 1999, the number of diabetes deaths as any listed cause increased 8.9% (from 966 to 1,052, respectively).

Diabetes-Related Deaths from Cardiovascular Disease



Cardiovascular disease (CVD) is the most common cause of death among adults with diabetes.² Figure 6-2 shows the age-adjusted rates (standardized to the U.S. 2000 population) for years 1992 to 1999 with cardiovascular disease as the underlying cause of death and diabetes as a contributing cause.

CVD deaths account for approximately one-third of deaths among people with diabetes in Utah. In 1999, 325 deaths among people with diabetes listed CVD as the underlying cause. This amounts to 30 percent of the 1,052 diabetes-related deaths. This percentage is well under the national estimate of 40 percent.³

In 1997, the national age-adjusted diabetes-related CVD deaths was 343 per 100,000 individuals with diabetes.⁴ This rate compares to a rate of 247.4 CVD deaths per 100,000 Utahns with diabetes that same year.

Contrasts in Diabetes Deaths by Ethnicity

Table 6-2. Contrasts of Diabetes-Related Deaths to All Deaths by Age and Ethnicity Utah Bureau of Vital Records and Statistics, 1995-1999						
Age	<u>Hispanic</u>			<u>Non-Hispanic</u>		
	Number of Deaths with Diabetes as Any Listed Cause	Total Deaths from all Causes	Percent of Deaths for Hispanic Utahns Listing Diabetes	Number of Deaths with Diabetes as Any Listed Cause	Total Deaths from all Causes	Percent of Deaths for Non- Hispanic Utahns Listing Diabetes
Less than 20	0	169	0.0	8	1,476	0.5
20-39	3	348	0.9	97	2,930	3.3
40-59	38	359	10.6	474	6,468	7.3
60-69	43	264	16.3	746	6,707	11.1
70 and over	110	870	12.6	3,438	37,421	9.2

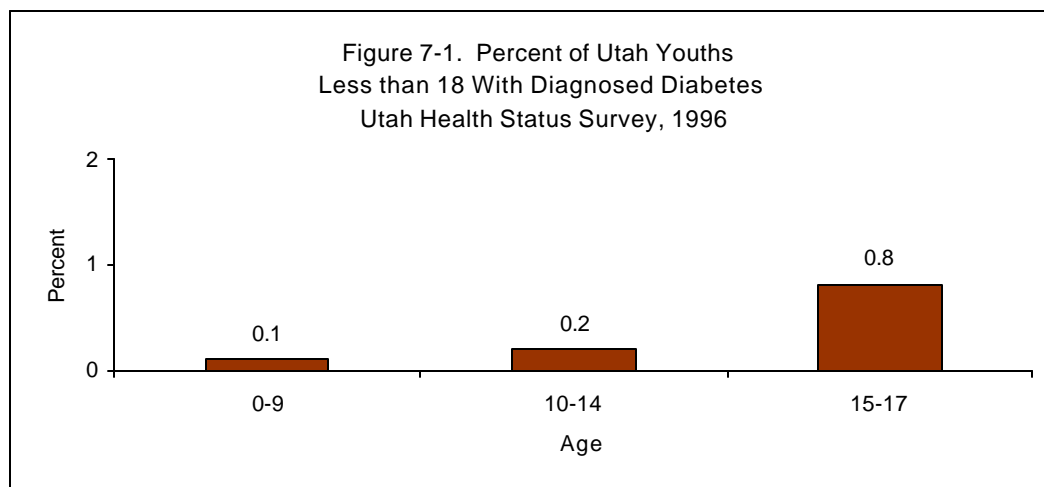
The information in Table 6-4 is included to illustrate the differences in the percent of deaths related to diabetes by ethnicity. The percent of diabetes-related deaths is lower for deaths to Hispanics than is the percent of diabetes-related deaths for deaths to non-Hispanics prior to the age of 40. Diabetes-related deaths are higher for Hispanics in each age group age 40 and above.

References and Notes

1. Utah has a younger population than the United States, but age-adjusting is use to remove the effect of age differences.
2. Wingard, DL, and E Barrett-Connor. Heart Disease and Diabetes (1995). *Diabetes in America* 429-448(2nd ed.). National Institutes of Diabetes and Digestive and Kidney Diseases, National Institutes of Health Publication 95-1468
3. Mortality (2001). *Diabetes 2001 Vital Statistics*, American Diabetes Association, Inc: 75-85.

Diabetes and Utah Youth

Diabetes is relatively uncommon in the population younger than age 18. An estimated 123,000 youth (under age 20) in the U.S. have type 1 diabetes, or 0.16% of the population of this age.¹ In Utah, an estimated 1,700 youths, 0.2% of the total population under 18, have diabetes.²



Type 1 diabetes is an autoimmune disease in which the body no longer produces insulin. For children, the risk is greater for developing type 1 diabetes than for any other chronic disease.³ Prevalence of type 1 diabetes is higher in Non-Hispanic Whites than in other racial or ethnic groups.

Children with type 1 diabetes are at risk for ketoacidosis. Frequently, children are first diagnosed when they are admitted to the hospital with this condition. Ketoacidosis is characterized by excess blood glucose, resulting in dehydration, nausea, and abdominal pain. For discharges in 1999, where diabetes is listed as the primary diagnosis, over half (53.6%) listed ketoacidosis. Proper monitoring can significantly decrease the chance of ketoacidosis from reoccurring.

The incidence of type 1 diabetes peaks around the age of puberty. Most youth with diabetes have type 1, although there has recently been an alarming increase in the incidence of type 2 diabetes among the younger population.⁴ This rise correlates with rising obesity among children. Physical inactivity and high-fat diets contribute greatly to both increases in obesity and type 2 diabetes among children. Children with type 2 diabetes generally have a family history of type 2 diabetes and are obese (body mass index above the 85th percentile). Children with type 2 may have normal or high c-peptide and insulin levels.

Hospitalizations for Utah Youth with Diabetes

Table 7-1 shows discharge information for individuals under 18 with diabetes listed as any diagnosis on the hospital record. A total of 413 discharges listing diabetes as any diagnosis were reported in 1999 for individuals under the age of 18. Females have slightly higher numbers of discharges and rates than males (See Appendix B). There was very little difference in the average age at discharge, 11.2 years for males and 11.4 for females. The average stay for males was slightly higher than the average stay for females (2.6 days vs. 3.1 days, respectively). The longer length of stay for females is reflected in the higher average charge, \$5,220 for females vs. \$5,014 for males.

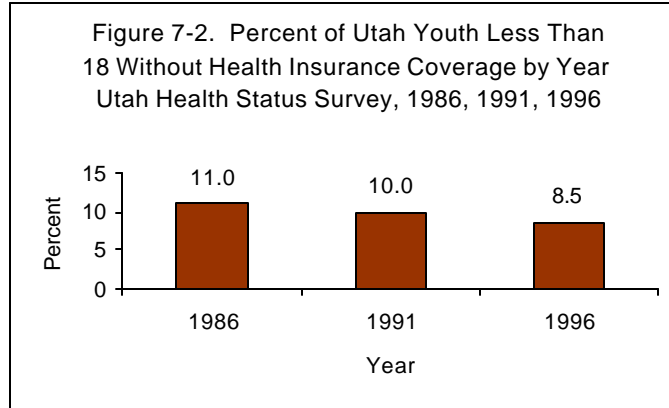
Table 7-1. Discharge Data for Utah Youth, Less Than 18, With Diabetes Listed as Any Diagnosis Utah Inpatient Hospital Discharge Database, 1999			
	Males	Females*	Total**
Number Reporting	194	217	413
Average Age	11.2	11.4	11.3
Average Length of Stay (days)	2.6	3.1	2.9
Average Charge	\$5,014	\$5,220	\$5,110

* One female is not included in the averages (information not available)

**Total may be larger than the sum of cases; gender is occasionally encrypted for confidentiality

Health Insurance Coverage Among Utah Youth

The percentage of all Utah youth not covered by health insurance has declined steadily, from 11.0% in 1986 to 10.0% in 1991 and 8.5% in 1996 (Figure 7-2).⁵ Diabetes is an expensive disease and insurance coverage is important for youth to eliminate the barriers to proper monitoring.



References and Notes

1. Diabetes at a Glance (2001). *Diabetes 2001 Vital Statistics*. American Diabetes Association, Inc: 1-4
2. Percentages from Utah Health Status Survey, 1996, applied to 2000 Utah population
3. Diabetes in Children. Downloaded 8/16/01 American Diabetes Association: Affected-Children. <http://www.diabetes.org/main/info/default4.jsp>
4. American Diabetes Association. Type 2 Diabetes in Children and Adolescents. *Diabetes Care*: 22 (12): 381
5. Office of Public Health Assessment (1996) *Utah Health Status Survey*. Salt Lake City, UT: Utah Department of Health.

Technical Notes and Data Sources

Section 1

Overview of Diabetes in Utah

Figure 3-1 is included to illustrate the proportion of the Utah population, 2000, comprised of various ethnic and racial groups. While Hispanics may be of any race, over 85 percent of Hispanics in Utah consider themselves to be white. Changes to race classifications were made for the 2000 Census. Asian Americans and Pacific Islanders, grouped together in the 1990 Census, were identified by separate categories in 2000. Individuals were also able to self-report themselves as two or more races; still, the majority of the population in Utah, 97.9 percent used one race only.

Section 2

Socioeconomic Characteristics of Utah Adults with Diabetes

Data for Section 2 are drawn from the Behavioral Risk Factor Surveillance System (BRFSS). Since 1984, the Centers for Disease Control and Prevention (CDC) has been monitoring the participation of American adults and their health-related behaviors through this survey. The BRFSS is an annual telephone survey designed to assess various behavioral and health risk factors and socioeconomic conditions among adults 18 and over. The state of Utah has participated in this survey since 1984. An average of 240 interviews per month are completed, or 2,880 per year. Each year, between 100 and 125 respondents report having been diagnosed with diabetes.

Income figures should be interpreted with some caution: income was not reported for approximately 13% of the respondents for years 1998 to 2000.

Section 3

Comorbidity, Lifestyles, and Quality of Life Among Utahns with Diabetes

The Utah Health Status Survey, conducted by the Office of Public Health Data, provides information on health status and health care access statewide and by health district. Information in this surveillance report contains information from the most recent wave of this survey, 1996. This survey has been conducted every five years since 1986. Approximately 6,300 Utah households are included in the sample, disproportionately stratified by the 12 local health districts. Survey results were weighted to adjust for the age, sex, geographic distribution and Hispanic status of the population. Telephone interviews were conducted by the Gallup Organization using computer-assisted random digit dialing. One adult, 18 and over, was randomly selected to respond to questions about themselves, their households, or selected

members of their households.

Section 4

Diabetes Management and Complications

The 1997 Utahns with Diabetes Survey is a follow-up survey to the 1996 Utah Health Status Survey (See notes for Section 3, above). A total of 557 cases of diabetes were recorded in the Utah Health Status Survey (2.9 percent of the sample). Respondents, or the most opportunity adult for youth under 18, were re-contacted for participation in the follow-up Utahns with Diabetes Survey. Some returned questionnaires were excluded from the analyses: persons who returned questionnaires stating that no one in the household had diabetes; women who reported they had gestational diabetes only; and persons who telephoned or wrote back, stating that they chose not to participate. A total of 239 completed questionnaires were returned.

Section 5

Hospitalizations for Utahns with Diabetes

Since January, 1, 1992, all licensed Utah hospitals, both general acute care and specialty care, have been mandated to report information on inpatient discharges (Administration Rule R428). The Utah Inpatient Hospital Discharge Data Base (UHDDDB) contains information on charges and billing, diagnostic codes, procedure codes, lengths of stay, and limited demographic information for each inpatient hospital stay. No individually identifying characteristics are included. The Office of Health Care Statistics provides a public-use data set, which contains information from 50 acute care hospitals and no individually identifying characteristics. The information in this report contains information from the public-use data set. This data set has been available since 1992. Listings for diagnoses six through nine and procedures six through nine were added in 1995. Hospitals record diagnoses using ICD-9 codes and are expected to begin using ICD-10 codes in calendar year 2002.

The ICD-9 codes used in Section 5, Table 5-1, are shown below. Information contained in Table 5-1 should be used with caution. Ranges for the figures reported for the means for lengths of stay and average cost per discharge are large. Figures are included primarily for comparison purposes.

Reason for Hospitalization	ICD-9-CM Codes
Any listed (Diagnoses 1-9)	ICD-9-CM 250 for all diabetes-related hospitalizations
Primary diagnosis	ICD-9-CM 250 for primary diagnosis of diabetes
Acute metabolic complications	ICD-9-CM 250.1 (ketoacidosis), 250.2 (hyperosmolar coma), or 250.3 (other coma) as primary diagnosis
Major cardiovascular disease	ICD-9-CM 390-448 as primary diagnosis and any listed ICD-9-CM 250
Lower extremity amputation	Any listed ICD-9-CM 250 with a procedure code 84.1 for nontraumatic amputation of lower limb
Renal complications (Kidney dialysis or transplant)	Any listed ICD-9-CM 250.4 OR any listed ICD-9-CM 250 with procedure codes 55.6 (renal transplant) or 39.95 (hemodialysis) for renal disease, kidney transplant, or hemodialysis
Ophthalmic manifestations	Any listed ICD-9-CM 250.5

Section 6

Diabetes-Related Mortality

The Bureau of Vital Records and Statistics, Utah Department of Health, houses the death certificate records. Death certificates record the underlying cause of death as well as up to nine contributing causes or other conditions.

Underlying cause of death is generally defined as “the disease or injury which initiated the sequence of morbid events leading directly to death” (Utah Vital Statistics: Birth and Deaths, 1999: A-12). Death records are sent to the National Center for Health Statistics where SUPER-MICAR software is used to classify the listed causes as underlying or contributing. In this report, causes of deaths occurring between 1995 and 1998 are identified using ICD-9 codes. The code range used for diabetes was ICD-9 250.00-250.99. In 1999, the Utah Bureau of Vital Records and Statistics began recording information using ICD-10 codes. The revised code range for diabetes is E10.00 - E14.99. The new codes distinguish between insulin dependent diabetes and non-insulin dependent diabetes.

E10.00- E10.99 Insulin dependent diabetes mellitus
E11.00- E11.99 Non-insulin dependent diabetes mellitus
E12.00- E12.99 Malnutrition-related diabetes mellitus
E13.00- E13.99 Other specified diabetes mellitus
E14.00- E14.99 Unspecified diabetes mellitus

Section 7

Diabetes and Utah Youth

Insurance information from the Utah Health Status Survey is based on information reported at the household level reported by the most knowledgeable adult. See the notes on Section 3 of the Technical Notes and Data Sources Section for more information on the Utah Health Status Survey.